
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

In re application of: PATRICK et al.

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Examiner: MARKOFF, A.

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Title: APPARATUS FOR IMPROVING ETCH
UNIFORMITY AND METHODS
THEREFOR

CERTIFICATE OF EXPRESS MAILING

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Signed: 
Alison Gates

CLEAN VERSION OF PENDING CLAIMS

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please replace the entire Claims section starting on page 15, line 1 and ending on page 19, line 17, with the following:

CLAIMS

What is claimed is:

1. (Thrice Amended) In a plasma processing chamber, a method for improving etch uniformity while etching a semiconductor substrate, comprising:

placing said semiconductor substrate into a sacrificial substrate holder, said sacrificial substrate holder being configured to present a sacrificial etch portion surrounding said semiconductor substrate to a plasma within said plasma processing chamber to permit said plasma to etch a first surface of said semiconductor substrate and a first surface of said sacrificial etch portion simultaneously, said first surface of said sacrificial etch portion being

formed of a pure metallic material capable of being etched by said plasma and configured to be parallel with said first surface of said semiconductor substrate;

positioning said semiconductor substrate and said sacrificial substrate holder into said plasma processing chamber;

striking said plasma from an etchant source gas released into said plasma processing chamber; and

simultaneously etching said first surface of said semiconductor substrate and said first surface of said sacrificial etch portion using said plasma.

2. The method of claim 1 wherein said semiconductor substrate represents a wafer and wherein said sacrificial etch portion represents a ring surrounding said wafer.

4. (Twice Amended) The method of claim 1 wherein said etching is a metallization etch, said pure metallic material comprising pure aluminum.

5. The method of claim 4 wherein said etchant source gas includes chlorine.

6. The method of claim 5 wherein said plasma processing chamber represents an inductively coupled plasma processing chamber.

7. The method of claim 1 wherein said semiconductor substrate represents a substrate for fabricating integrated circuits (IC's).

8. The method of claim 1 wherein said plasma processing chamber represents an inductively coupled plasma processing chamber.

9. (Once Amended) The method of claim 1 wherein said etching is a metallization etch and said pure metallic material comprises 99.999% pure aluminum.

10. The method of claim 1 wherein said material is selected to form substantially volatile byproducts when etched by said plasma within said plasma processing chamber.

25. In a plasma processing chamber, a method for improving etch uniformity while etching a semiconductor substrate, comprising:

providing an annular sacrificial substrate holder having a substantially pure metallic planar upper surface;

placing a semiconductor substrate within said sacrificial substrate holder such that an upper surface of said semiconductor substrate is substantially even with said planar upper surface of said annular sacrificial substrate holder; and

creating a plasma etching cloud from an etchant source gas released into said plasma processing chamber to simultaneously etch said upper surface of said semiconductor substrate and upper planar surface of said sacrificial etch portion, wherein said sacrificial substrate holder is dimensioned such that said plasma etching cloud extends beyond an outer periphery of said sacrificial substrate holder during said etching.

26. The method of claim 25 wherein said etching is an aluminum etch and wherein the substantially pure metallic planar upper surface consists essentially of aluminum.

27. The method of claim 26 wherein said etchant source gas includes chlorine.

28. The method of claim 27 wherein said plasma processing chamber represents an inductively coupled plasma processing chamber.

29. The method of claim 25 wherein said plasma processing chamber represents an inductively coupled plasma processing chamber.

30. (Once Amended) The method of claim wherein said etch is a metallization etch and said pure metallic material comprises 99.999% pure aluminum.

31. The method of claim 25 wherein a lower surface of said semiconductor substrate is in direct contact with a chuck of said plasma processing chamber.

32. The method of claim 31 wherein said chuck represents a chuck employing helium cooling.

33. The method of claim 25 wherein an inner periphery of said annular sacrificial substrate holder is dimensioned to contact said semiconductor substrate.

Respectfully submitted,
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